- $\text{CONV}_{n,q}$ — conventional capacity
- $\text{CONVgen}_{n,m,q}$ — conventional generation
- $\text{SR}_{n,m,q}$ — spinning reserve capacity
- $\text{QS}_{n,q}$ — quickstart capacity
- $\text{CONVT}_{n,p,m}$ — conventional transmission needs
- $\text{STOR}_{n,st}$ — new storage capacity
- $\text{STORin}_{n,m,st}$ — energy into storage
- $\text{STORout}_{n,m,st}$ — energy from storage
- $\text{STOR\_OR}_{n,m,st}$ — storage operating reserve capacity
- $\text{TPCAN}_{n,p}$ — new transmission capacity for dispatchable sources
- $\text{CONTRACTcap}_{n,p}$ — firm capacity contracted from another region
- RPSshortfall

3.3 Objective Function

In the objective function we minimize z where

$$
\begin{aligned}
z \quad = \quad & \sum_{c,i,l} \text{Wtur}_{c,i,l} \cdot \$capacity_l \\
+ \quad & \sum_{c,i,j,l} \text{WN}_{c,i,j,l} \cdot \$capacity_l \\
+ \quad & \sum_{cCSP,i} \text{CSPtur}_{cCSP,i} \cdot \$capacity \\
+ \quad & \sum_{cCSP,i,j} \text{CSPN}_{cCSP,i,j} \cdot \$capacity \\
+ \quad & \sum_{n,q} \text{CONV}_{n,q} \cdot \$capacity_q \\
+ \quad & \sum_{n,p} \text{TPCAN}_{n,p} \cdot \$capacity \\
+ \quad & \sum_{n,m,q} \text{CONVgen}_{n,m,q} \cdot (\$operation_q + \$fuel_q) \\
+ \quad & \sum_{n,m,q} \text{SR}_{n,m,q} \cdot \$operation_q \\
+ \quad & \sum_{n,q} \text{QS}_{n,q} \cdot \$capacity_q \\
+ \quad & \sum_{n,st} \text{STOR}_{n,st} \cdot \$capacity_{st} \\
+ \quad & \sum_{n,m,st} \text{STORout}_{n,m,st} \cdot (\$operation_{st} + \$fuel_{st}) \\
+ \quad & \sum_{n,m,q} \text{CONVgen}_{n,m,q} \cdot \$pollution_q \\
+ \quad & \text{RPSshortfall} \cdot \$penalty
\end{aligned}
$$